(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 454 632 A1**

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **91830158.1**

(51) Int. Cl.[5]: **B65B 57/10**

(22) Date of filing: **23.04.91**

(30) Priority: **23.04.90 IT 479390 U**

(43) Date of publication of application:
30.10.91 Bulletin 91/44

(84) Designated Contracting States:
CH DE ES FR LI

(71) Applicant: **WIN.PACK S.r.L.**
Via Rossini, 24
Villanova di Castenaso(Bologna) (IT)

(72) Inventor: **Gaudenzi, Rodolfo**
Via Cavazzoni, 25
Bologna (IT)

(74) Representative: **Dall'Olio, Giancarlo**
INVENTION s.n.c. Via Arienti 26
I-40124 Bologna (IT)

(54) **Device for checking the presence of containers to be packaged.**

(57) The device for checking the presence of containers to be packaged comprises a plurality of feeling means (8) supported in such a way that they can swing about a vertical axis (9) and located beside means (3) for conveying piles (20) of containers (2) to be packaged.

The feeling means can this way revolve from a rest position (8a), where they result to protrude at one end over said conveying means (3), to an activated position (8b), wherein they laterally strike against said containers (2), and vice versa under the action of spring means.

Sensing means (12,13) are also provided for sensing the rotation of said feeling means (8) between the rest position (8a) and the activated position (8b).

EP 0 454 632 A1

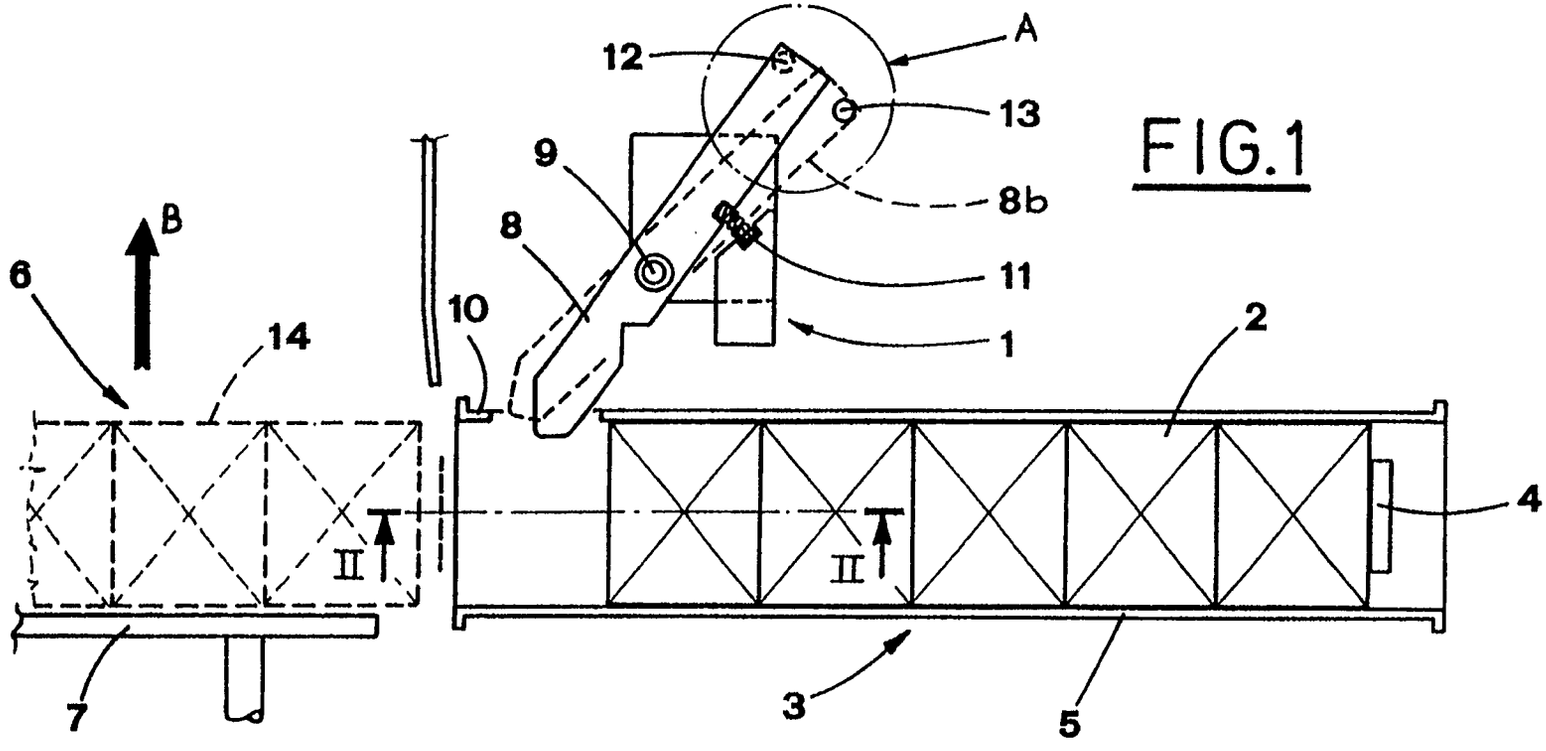


FIG.1

This invention relates to the technical field concerning the packaging of orderly groups of containers into cartons.

Automatic machines of various kinds are known, which package cases or containers, wherein different products are usually packed, into cartons.

Such machines are provided with means to form orderly piles of containers, means to convey the piles of containers and pushing means for transferring the piles of containers into the carton.

With the above-mentioned machines a problem arises, i.e. how to check the actual presence of the predetermined number of containers, when inserting them into the carton.

In fact, serious inconveniences are met by delivering to the trade cartons containing a number of packages lower than stated, specially in the case of expensive products.

In order to avoid such inconveniences, some packaging machines are provided with devices having the purpose of checking the height of the piles of containers being sent to the packaging section; the check is usually carried out through special level-sensing means, or means to sense the beginning and/or the end of groups of containers.

However, the above-mentioned devices are not able to guarantee the actual presence of all the containers as expected.

In fact, it may happen that, due to a wrong positioning in the piling-up phase, the piles present the height required even in the absence of one or more containers.

Some possible cases of wrong positioning of the containers are illustrated, by way of example, in figs. 5, 6 and 7 of the drawings enclosed.

In particular, the wrong positioning is related to the axial displacement of two containers along the conveying line (fig. 5); or it may be due to the arrangement of a container in an inclined position (fig.6); or it may be caused by the rotation of a container that does not keep the proper conveying position (fig.7).

The objects of the present invention is to provide a device that makes it possible to check the actual presence of all the containers provided in the orderly piles that are to be packaged by a special machine.

Another object of the present invention is to provide a device to check the presence of containers to be packaged, obtained through a technical solution which is simple, functional and reliable, as well as of versatile use.

The above-mentioned objects are achieved through a device for checking the presence of containers to be packaged, characterized in that it comprises a plurality of feeling means supported in such a way that they can swing around a vertical axis and located beside means for conveying the piles of containers to be packaged, said feeling means moving from a rest position, where they result to protrude at one end over said conveying means, to an activated position, wherein they laterally slide against said containers, and vice-versa.

Moreover there are sensing means provided for sensing the rotation of said feeling means between said rest position and said activated position.

The invention shall be described further, by way of example, with reference to the accompanying drawings, wherein:

- fig. 1 is a schematic top view of the check device provided by the present invention, arranged close to means for conveying the piles of containers to be packaged;
- fig. 2 is a section view according to the line II-II of fig. 1;
- fig. 3 is a detailed view of the detail A of fig. 1;
- fig. 4 is a view of the device from the side indicated by arrow X in fig. 3;
- figs. 5, 6 and 7 show groups of containers to be packaged, presenting gaps of various kinds in the formation of piles.

With reference to said figures, the numeral 1 generally designates the device to check the presence of containers 2 to be packaged. The containers 2, arranged in orderly piles 20, are fed by conveying means 3 provided with a pushing means 4; the pushing means 4 carries out the advance of a predetermined group of piles 20, arranged close to each other along the conveying line and guided between two side walls 5, to a packaging station 6.

Close to the station 6, operates a means 7 to transfer the piles 20 into a suitable carton, not illustrated in the drawings. The transferring means 7 is operated in the direction B transverse to the conveying line of the means 3.

The check device 1 is provided with a plurality of feeling means 8, which are swingingly supported around a vertical axis 9 beside the conveying means 3.

The feeling means 8 consist of lamellar rods arranged on horizontally adjacent planes, so as to intercept respective containers 2 arranged in a pile; it is usefully provided for each container 2 of the pile to be interested by at least two feeling means 8.

The feeling means 8 are able to swing between a rest position in which they result to face each other with the free end inside the conveying line, through an opening 10 made in a wall 5, close to the outlet of the conveying means 3; and an activated position, rotated outside the conveying line, in contrast with respective spring means 11.

For the sake of clarity, in fig. 3 said rest position and said activated position of the feeling means are respectively designated by 8a and 8b.

Furthermore, the device 1 also comprises sensing means 12 and 13 which are suited to act at the rear end of the feeling means 8, respectively close to the rest position 8a and to the activated position 8b.

The sensing means 12 and 13 consist of respective pairs of photoelectric sensors, respectively transmitters and receivers, and they are connected to suitable checking means of the machine, not illustrated.

The device operates as follows. The group of piles 20 of containers 2 to be packaged advances along the conveying line defined by the means 3 and it is pushed into the packaging station 6, as indicated by broken line 14, where the transferring means 7 provide for pushing it into the carton.

When passing close to the opening 10, the containers 2 strike laterally against the end of the feeling means 8, causing them to rotate from the rest position 8a to the activated position 8b.

The sensing means 12, 13 are able to sense said rotation of the feeling means 8 and consequently to signal the passing of the piles 20 of the containers 2 to be packaged.

More particularly, in the rest position 8a result to be active the sensing means 13, while the sensing means 12 are deactivated by the interposition of the feeling means 8 (fig.4); vice versa, when passing to the activated position 8b caused by the engagement with the containers 2, the sensing means 12,13 are commutated, therefore the sensing means 12 result to be active, while the sensing means 13 are deactivated.

As it may be seen in detail in fig. 3, when the feeling means 8 pass from the rest position 8a to the activated position 8b, a position 8c is transitorily determined, wherein both sensing means 12 and 13 result to be activated, since said feeling means are disposed in an intermediate position between the same sensing means. Said transitory position 8c is suited to supply the signal to start the operation of the check device. An analogous transient signals the end of the passing of the piles 20 to be packaged.

In case of absence of one or more containers 2 in the piles 20, the check device provides to signal the gap. In fact, when a gap passes in front of the check device, the feeling means located on the plane where said gap occurs are sent back to the position 8a by the relative spring means 11, deactivating the sensing means 12. The contemporary deactivation of the sensing means 12 and 13 signals the irregularity of the pile.

It is to be noticed that the feeling means 8 are able to signal the gap in any zone it occurs, even in the case that the piles maintain the predetermined height.

In fig. 15 is illustrated, by way of example, the gap occurring between two containers 2a, 2b displaced axially along the conveying line. In fig. 6 the gap is partially occupied by a container 2c disposed in inclined position; in this case, the presence of at least two feeling means for each container of the pile assures the detection of the gap.

In fig. 7, the gap is caused by the rotation of a container 2d or of a whole pile transversely to the proper conveying position.

The feeling means 8 may either be translated as a whole, or mutually brought near and moved away from each other along the axis 9: the relative means to carry out such translations are not illustrated, since they are known.

This makes it possible to adjust, in an optimal way, the check device in relation to the size of the containers to be packaged.

In conclusion, the device conforming to the invention makes it possible to check the possible presence of any gap in the piles of containers to be packaged.

It should be pointed out that the device is operated at the beginning of the passing of the group of piles to be packaged and automatically stopped at the end of said passing, corresponding to the respective transients of the oscillation of the feeling means.

Therefore, it is not necessary to adjust the operation of the device in relation to the length of the group of piles, on the contrary it adjusts itself to any length automatically.

The sensing means 12, 13 can be of any type, particularly of electro-mechanical type, and suited, when necessary, to be associated with each feeling means 8; the data collected by said sensing means are sent to said checking means where they are "processed" similarly to what has been said above.

Claims

1) Device for checking the presence of containers to be packaged, **characterized in that** it comprises a plurality of feeling means (8) supported in such a way that they can swing about a vertical axis (9) and located beside means (3) for conveying piles (20) of containers (2) to be packaged, said feeling means revolving from a rest position (8a), where they result to protrude at one end over said conveying means (3), to an activated position (8b), wherein they laterally strike against said containers (2), and vice versa; sensing means (12,13) being also provided for sensing the rotation of said feeling means (8) between said rest position (8a) and said activated position (8b).

2) Device according to Claim 1, **characterized in that** said feeling means (8) consist of lamellar rods disposed on horizontally adjacent planes, so as to intercept, at the end, respective containers (2) of the pile (20).

3) Device according to Claim 1, **characterized in that** each container (2) of the pile (20) is intercepted by at least two of said feeling means (8) disposed at different heights.

4) Device according to Claim 1, **characterized in that** said feeling means (8) are caused to rotate to said activated position (8b) in contrast with spring means (11).

5) Device according to Claim 1, **characterized in that** there is an intermediate position (8c) for said feeling means, said intermediate position being transitorily determined when said feeling means are positioned between said rest position (8a) and said activated position (8b) so that both of said sensing means (12,13) are activated and a signal is supplied at the start and at the end of the passage of the piles (20) to be packaged.

6) Device according to Claim 1, **characterized in that** said sensing means (12,13) are positioned near the rear end of said feeling means (8), and are respectively activated when said feeling means are in said rest position (8a) and in said activated position (8b).

7) Device according to Claim 1, **characterized in that** said sensing means (12,13) consist of pairs of photoelectric sensors, respectively transmitting sensor and receiving sensor.

8) Device according to Claim 1, **characterized in that** there are spring means (11) acting on said feeling means, so that when a gap occours in a pile (20) of containers (2), the concerned feeling means (8) are displaced to said rest position (8a), thus deactivating said sensing means (12).

9) Device according to Claim 1, **characterized in that** said sensing means (12,13) are electro-mechanical means.

FIG.2

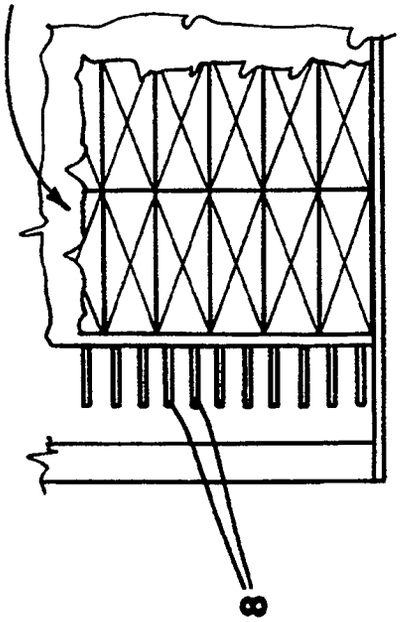
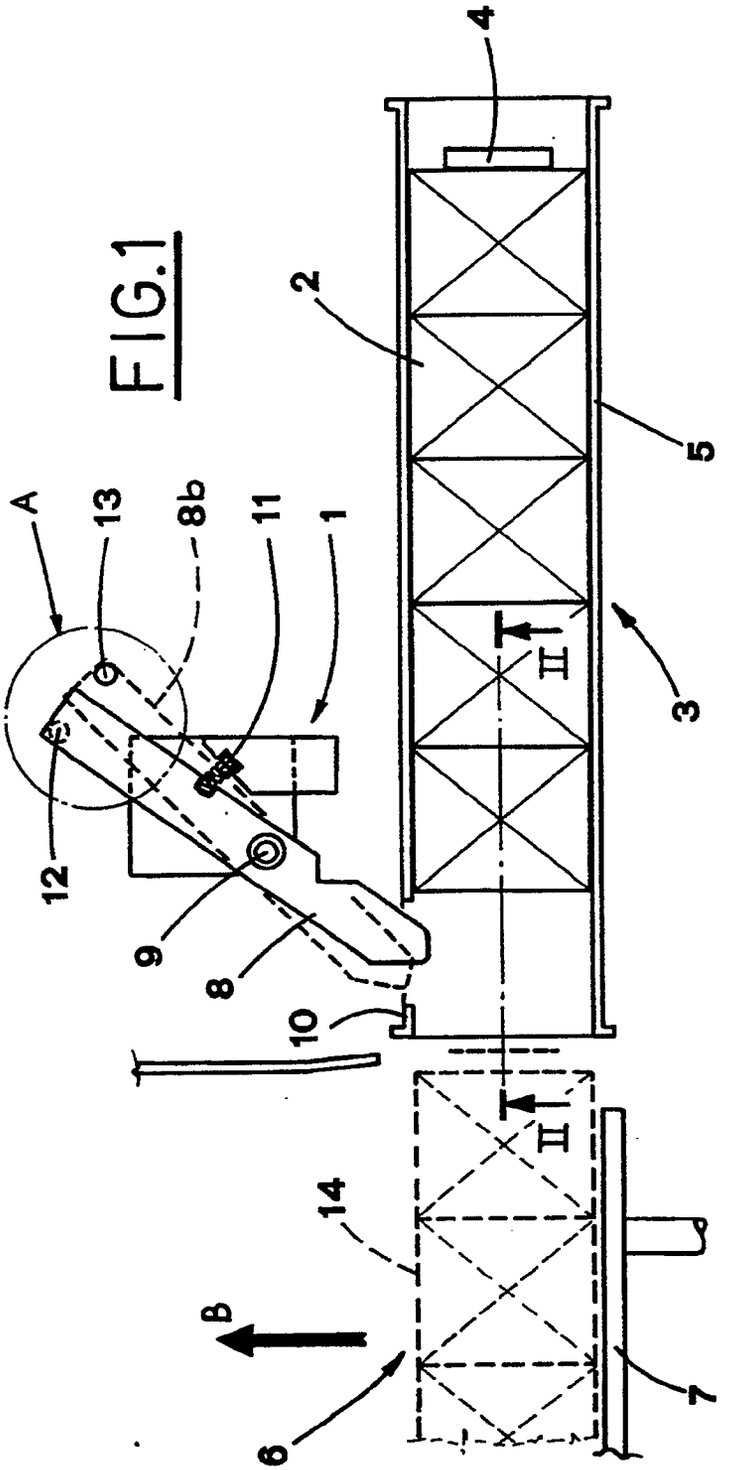


FIG.1



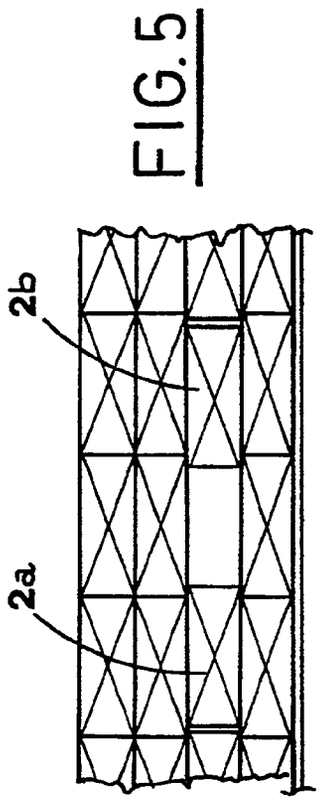


FIG.5

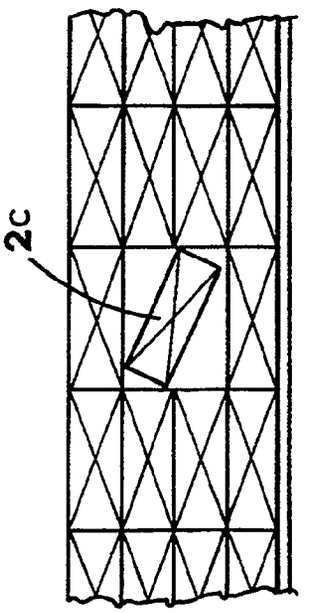


FIG.6

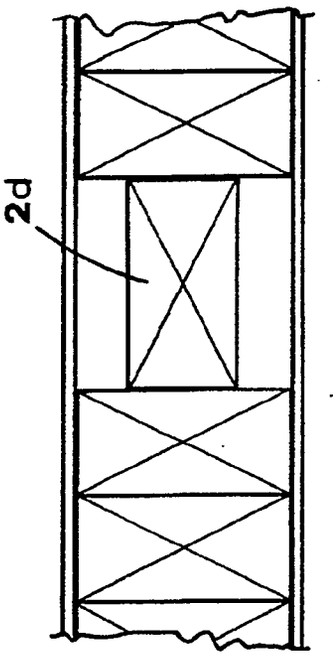


FIG.7

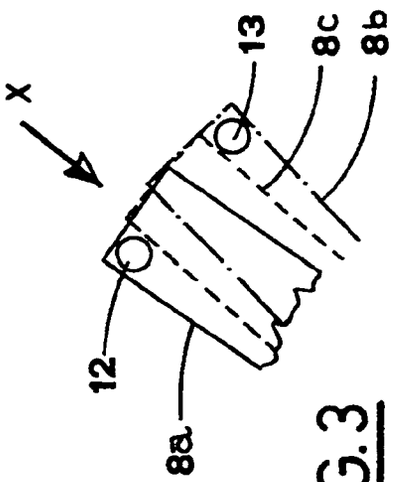


FIG.3

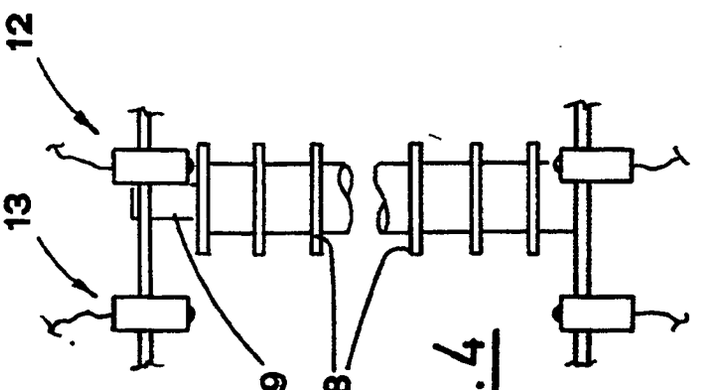


FIG.4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 83 0158

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X Y	FR-A-1 437 104 (LEIFELD) * the whole document * ---	1,2,6,7 4,8,9	B65B57/10
Y	GB-A-1 084 339 (SCHMERMUND) * page 2, line 119 - page 3, line 58; figure 2 * ---	4,8,9	
A	GB-A-1 302 079 (POLYGRAPH) * page 1, line 70 - page 2, line 9; figure 1 * -----	5	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)
B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	08 JULY 1991	CLAEYS H.C.M.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P0401)